

## DC MOTOR SPEED CONTROLLER

The KA2407 is a monolithic integrated circuit designed for DC motor speed controllers.

## FEATURES

- High stable operation over a wide range of supply voltage;  
 $V_{CC} = 3.5V \sim 14.4V$
- Stable low reference voltage (1.0V Typ) for wide motor speed setting
- A minimum number of external parts required
- Small four-lead plastic package for compact motor
- Reverse voltage protection circuit

## APPLICATIONS

- Tape recorders & recorder players
- Home stereos
- Car components

## BLOCK DIAGRAM

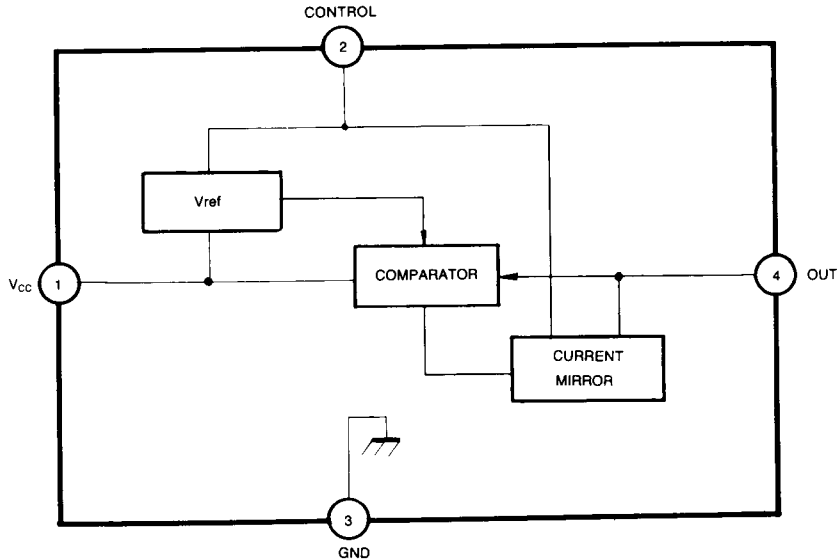
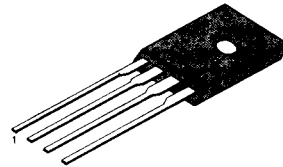


Fig. 1

TO-126



## ORDERING INFORMATION

Device	Package	Operating Temperature
KA2407	TO-126	$-20^{\circ}C \sim +70^{\circ}C$

## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	14.4	V
Supply Current	I <sub>CC</sub> (Note 1)	2	A
Power Dissipation	P <sub>D</sub> (Note 2)	1.3	W
Operating Temperature	T <sub>OPR</sub>	-20 ~ +75	°C
Storage Temperature	T <sub>STG</sub>	-40 ~ +150	°C

(Note 1): t ≤ 5 sec

(Note 2): Ta = 25°C, With a 100 × 100mm bakelite printed circuit board (35μm Cu leaf)

ELECTRICAL CHARACTERISTICS (Ta = 25°C, V<sub>CC</sub> = 6V)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit	Test Circuit
Reference Voltage	V <sub>REF</sub>	Ra = 1KΩ	0.85	1.0	1.15	V	1
Quiescent Circuit Current	I <sub>CCQ</sub>			0.8	1.8	mA	3
Current Coefficient	K	ΔI <sub>4</sub> = 40mA	35	40	45		2
Saturation Voltage	V <sub>SAT</sub>	V <sub>CC</sub> = 4.2V, Ra = 5Ω		1.15	2	V	1
Voltage Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta V_{CC}$	V <sub>CC</sub> = 3.5V ~ 14V, Ra = 1KΩ		-0.1		%/V	1
Voltage Characteristic of Current Coefficient	$\frac{\Delta K}{K} / \Delta V_{CC}$	V <sub>CC</sub> = 3.5V ~ 14V, ΔI <sub>4</sub> = 40mA		0.1		%/V	2
Current Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta I_4$	I <sub>4</sub> = 50mA ~ 200mA		-0.02		%/mA	1
Current Characteristic of Current Coefficient	$\frac{\Delta K}{K} / \Delta I_4$	I <sub>4</sub> = 50mA ~ 200mA		-0.01		%/mA	2
Temperature Characteristic of Reference Voltage	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta T_a$	Ta = -20 ~ +75°C, Ra = 1KΩ		0.01		%/°C	1
Temperature Characteristic of Current Coefficient	$\frac{\Delta K}{K} / \Delta T_a$	Ta = -20 ~ +75°C, ΔI <sub>4</sub> = 40mA		0.01		%/°C	2

TEST CIRCUIT 1

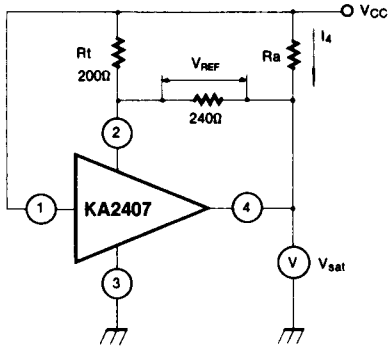


Fig. 2

$$V_{REF}, V_{SAT}, \frac{\Delta V_{REF}}{V_{REF}} / V_{CC}, \frac{\Delta V_{REF}}{V_{REF}} / I_d, \frac{\Delta V_{REF}}{V_{REF}} / T_a,$$

TEST CIRCUIT 2

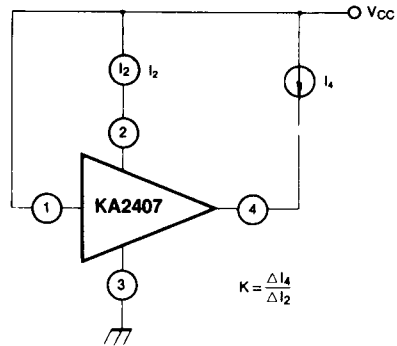
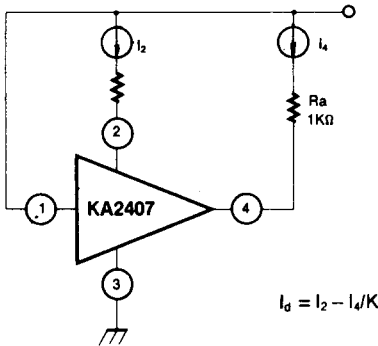


Fig. 3

$$K, \frac{\Delta K}{K} / V_{CC}, \frac{\Delta K}{K} / I_d, \frac{\Delta K}{K} / T_a$$

$K = \frac{\Delta I_d}{\Delta I_2}$

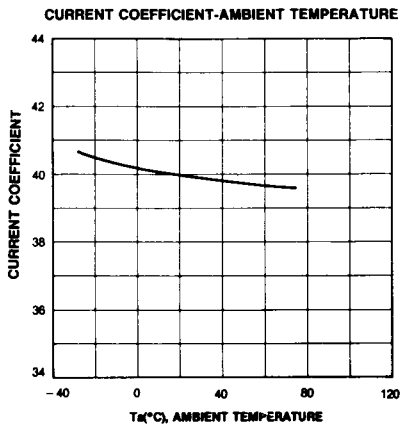
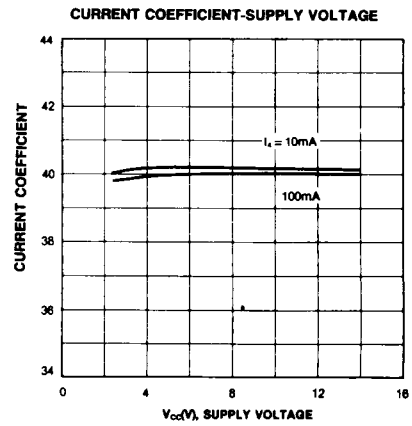
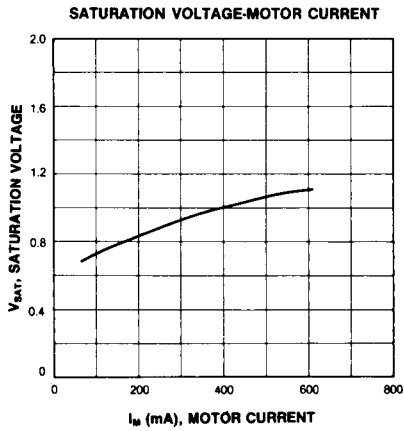
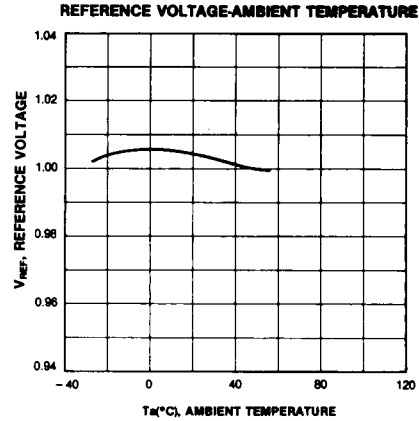
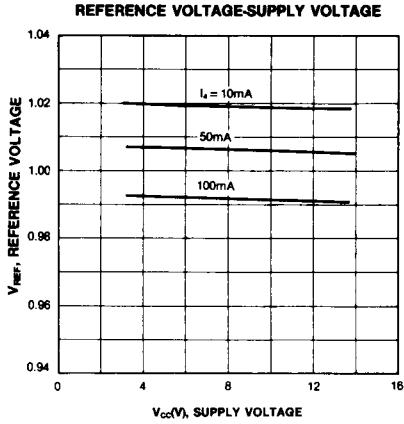
TEST CIRCUIT 3



$$I_d = I_2 - I_d / K$$

Fig. 4

3



**APPLICATION CIRCUIT**

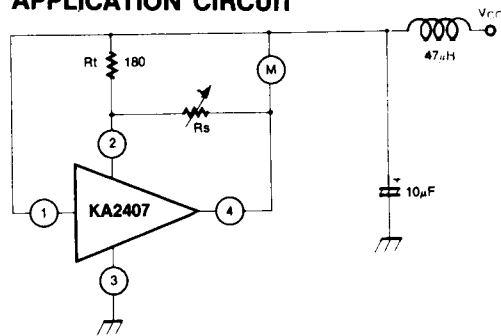


Fig. 5